

(19) World Intellectual Property
Organization
International Bureau



533330

(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/042801 A2

(51) International Patent Classification⁷: **H01L 21/00**

(74) Agent: **CHARIG, Raymond**; Eric Potter Clarkson, Park View House, 58 The Ropewalk, Nottingham NG1 5DD (GB).

(21) International Application Number:
PCT/GB2003/004705

(22) International Filing Date: 30 October 2003 (30.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0225586.7 2 November 2002 (02.11.2002) GB

(71) Applicant (*for all designated States except US*): **INTENSE PHOTONICS LIMITED** [GB/GB]; 4 Stanley Boulevard, Hamilton International Technology Park, High Blantyre, Glasgow G72 0BN (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventor; and

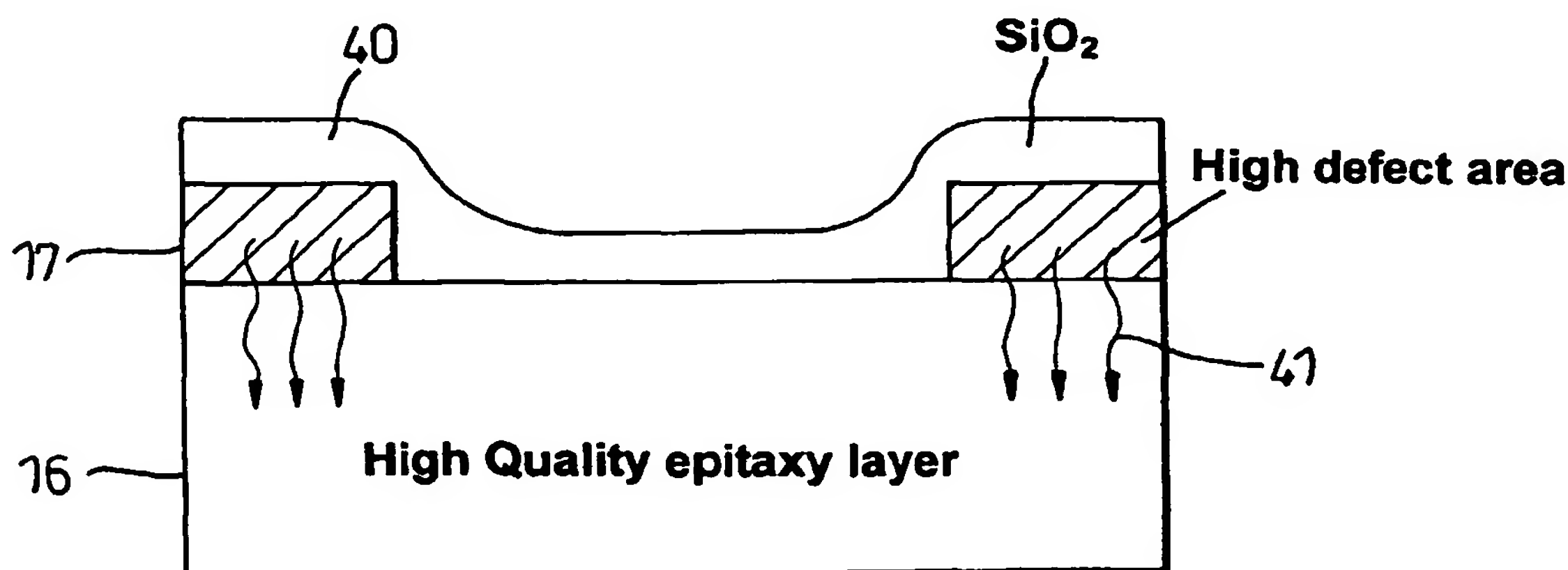
(75) Inventor/Applicant (*for US only*): **NAJDA, Stephen, Peter** [GB/GB]; 8/6 Fleming House, 134 Renfrew Street, Glasgow G3 6ST (GB).

Published:

— *without international search report and to be republished upon receipt of that report*

[Continued on next page]

(54) Title: QUANTUM WELL INTERMIXING IN SEMICONDUCTOR PHOTONIC DEVICES



(57) Abstract: A method for fabricating a semiconductor device in a semiconductor structure, provides enhanced quantum well intermixing in desired regions of the device by forming a first, relatively high quality, epitaxial layer on a substrate, the high quality layer including a quantum well; forming a second, relatively lower quality, epitaxial defect layer on top of the high quality layer; and thermally processing the structure to effect at least partial diffusion of the defects from the defect layer into the high quality layer in order to achieve quantum well intermixing in the structure. The use of an epitaxially grown defect layer on top of, or within, a high quality epitaxially grown device body enables quantum well intermixing techniques to be performed at lower temperatures and thereby improves device characteristics.

WO 2004/042801 A2



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.